Remarks

Claims 1-37 are pending. Applicant thanks the Examiner for his detailed review of the pending claims, and the indication of allowable subject matter with respect to claims 3, 4 and 20. Independent claims 1, 12, 27 and 34 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,008,425 to Dickey in view of U.S. Patent No. 5,402,280 to Supino. Dependent claims 2, 5-11, 13-19, 21-26, 28-33 and 35-37 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Dickey in view of at least one of: Supino; U.S. Patent No. 6,052,465 to Gotoh et al.; U.S. Patent No. 4,483,288 to Volz et al.; and article "Harmonic Generation in Adaptive Feedforward Cancellation Schemes" by Bodson.

Claim Objections

The Examiner indicated that claims 3, 4 and 20 contain patentable subject matter, but were objected to as being dependent on a rejected base claim. Applicant believes the objections are moot in view of the following arguments.

Claim Rejections Under 35 U.S.C. § 103(a)

Claim 1

Claim 1 recites an error correction circuit comprising:

> a sinusoidal error calculation portion adapted to generate a true oscillation error signal; and
>
> a summation portion adapted to combine the true oscillation error signal with a spindle error signal to generate a total error signal;
>
> wherein the sinusoidal error calculation portion is adapted to generate a new true oscillation error signal based on the total error signal.

The Examiner does not discuss claim 1 directly, but rather rejects claim 1 based upon the Examiner's evaluation of independent claim 34. Dickey is relied upon as the

primary reference for the rejection of claim 34, and Supino is relied upon as teaching "a motor control system in the disc drive environment as well as feeding an error signal into an appropriate summation device for generating an appropriate correction to reduce run-out." (Office Action, Page 3, last paragraph). Applicant respectfully disagrees.

Dickey does not disclose at least three of the elements of Applicant's claim 1. Dickey is directed to a motor control circuit employing hall elements to develop drive signals for a motor. The control circuit of Dickey includes a speed sensor or a phase sensor (element 14) which is compared in a servo (16) to a reference signal (at 18) to develop a DC output indicative of the degree of error of either the speed or the phase of the motor (10). The DC output is fed to hall elements (32, 34), which output a sinusoidal signal having a phase which follows the phase of the motor, and an amplitude proportional to the amplitude of the DC output of servo (16). The output of the first hall element (32) is 90 degrees out of phase with the second hall element (34). The output of each hall element (32, 34) is provided to a respective AC coupling circuit (44, 46) and in turn through a respective power amplifier (40, 42) to a respective motor winding (12).

Dickey does not teach "a sinusoidal error calculation portion adapted to generate a true oscillation error signal," as recited in claim 1. The Examiner states that such an element is taught by hall elements (32, 34). Applicant respectfully disagrees. Hall elements (32, 34) simply receive a DC current indicative of the magnitude of a velocity or phase error, and output a sinusoidal drive signal having an amplitude proportional to the magnitude of the error, and having a phase which follows the phase of the motor. Thus, while the output of the hall elements (32, 34) is indeed sinusoidal, it is simply indicative of the magnitude of the velocity (or phase) error of the motor, and provides no indication of a sinusoidal error. That is, the error information available from the output indicates only the magnitude of the error and the position of the motor when the error occurred.

Further, Dickey does not teach "a summation portion adapted to combine [a] true oscillation error signal with a spindle error signal to generate a total error signal," as recited

in claim 1. The Examiner asserts that the overall effect/operation of Dickey meets this element of claim 1. Applicant disagrees. The error signal provided by the Dickey servo (30) is provided to hall elements (32, 34). The hall elements (32, 34) combine this error signal with a position signal. The position signal indicates the position of the motor (10), but does not indicate whether the position of the motor differs from a proper or expected position. The position signal thus cannot be an error signal. In short, there is but a single error signal provided by the circuit of Dickey. The error signal is provided to a plurality of hall elements (32, 34) but it remains a single error signal. Accordingly, Dickey cannot possibly teach a summation portion adapted to combine a true oscillation error signal with a spindle error signal to generate a total error signal.

Moreover, Dickey does not teach that a "sinusoidal error calculation portion is adapted to generate a new true oscillation error signal based on the total error signal," as recited in claim 1. As claim 34 does not include such an element, Applicant assumes Examiner intended his arguments with respect to claims 35 and 36 to refer to this element of claim 1, as these claims include reference to analogous, though distinct, elements. The Examiner states, with respect to claims 35 and 36, that the "multiplier effect/elements as discussed with respect to figure 1" (Office Action, Page 4) disclose an adapter algorithm means, and that a summation means is taught as the output of elements (44) and (46). Applicant disagrees. First, the rejection does not clearly state how the prior art is supposed to teach a sinusoidal error calculation portion adapted to generate a new true oscillation error signal based on the total error signal. The teachings of Dickey are directed to a system wherein a drive signal is created based on the difference between an output from a sensor (14) and a reference signal (18). Subsequent drive signals are created based on comparisons of subsequent outputs from the sensor (14) to subsequent reference signals (18). The setup of Dickey thus does not teach that a new true oscillation error signal is generated based on a total error signal. Second, if the Examiner is suggesting that the "multiplier effect" discussed by Dickey with respect to figure 1, in combination with elements 44 and 46, teaches such an element, Applicant disagrees. The

"multiplier effect" discussed with respect to figure 1 is assumed to refer to the outputs of the "multiplier means 20, 22" (Dickey, column 2, line 37). Elements 44 and 46 are AC coupling circuits, as illustrated in Dickey's figure 3. As explained above with respect to hall elements (32, 34), this "multiplier effect" is simply the multiplier means (20, 22) multiplying the DC output of servo (16) by the phase of the motor (10). The referenced outputs of AC coupling circuits (44, 46) are each provided to separate and distinct windings (12) of the motor (10). Dickey states that "output currents are fed to respective windings 12" (Column 2, lines 47, 48). The output currents are not fed back other circuit elements, and are not used to determine subsequent true oscillation error signals. Accordingly, none of the elements of Dickey, alone or in combination, teach the required elements of claim 1. The addition of Supino to Dickey does not cure the deficiency.

Dickey, in combination with Supino, thus fails to teach all of the elements of claim 1. Applicant respectfully requests the rejection of claim 1, as well as dependent claims 2 – 11, be withdrawn.

Claim 12

Claim 12 recites, among other limitations, a disk drive including a control circuit, the control circuit comprising:

> a sinusoidal error correction portion adapted to generate a true oscillation error signal;
>
> a summation portion adapted to combine the true oscillation error signal with a spindle error signal to generate a total error signal; and
>
> wherein the sinusoidal error calculation portion is adapted to generate a new true oscillation error signal based on the total error signal.

The arguments presented above with respect to claim 1 are equally applicable to claim 12, and Applicant thus requests the rejection to claim 12 and dependent claims 13 – 26 be withdrawn.

Claim 34

Claim 34 recites an error correction circuit comprising, among other limitations:

> means for generating a true oscillation error signal;
> means for providing a spindle error signal; and
> means for combining the true oscillation error signal with the spindle error signal to generate a total error signal.

Arguments presented above with respect to claim 1 are equally applicable to claim 34. Dickey fails to teach at least a means for generating a true oscillation error signal, and a means for combining a true oscillation error signal with a spindle error signal to generate a total error signal. Accordingly, Applicant requests the rejection to claim 34 be withdrawn, as well as the rejection to dependent claims 35 – 37.

Claim 27

Claim 27 recites a method comprising, among other elements:

> generating a true oscillation error signal;
> determining an actual rotational speed of the recordable disk;
> determining a target rotational speed of the recordable disk;
> combining the target rotational speed of the recordable disk with the actual rotational speed of the recordable disk to determine a spindle error signal; and
> combining the spindle error signal with the true oscillation error signal to determine a total error signal.

Arguments presented above with respect to the rejection of claim 1 are equally applicable to claim 27. Dickey fails to teach a true oscillation error signal, and accordingly fails to teach generating such a signal. Further, Dickey fails to teach combining a spindle error signal with a true oscillation error signal to determine a total error signal. The addition of Supino fails to cure the deficiencies of Dickey. Applicant thus requests the

rejection to claim 27, as well as the rejection to dependent claims 28 – 33, be withdrawn and the claims be allowed to issue.

CONCLUSION

All rejections having been addressed, Applicant believes the pending application is in condition for allowance.

Applicant believes any fee due has been addressed in the accompanying transmittal charging Deposit Account No. 08-2025, under Order No. 200313604-1 from which the undersigned is authorized to draw.

Dated: September 17, 2007

Respectfully submitted,

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